

# PROTECT D.

*Uninterruptible power supply  
for critical applications as e.g.  
sensitive networks, small data  
centres, Intra-/ & Internet servers.*

Data & IT / C-UPS / PM - Schneider

September 2010



## Renewable Energy Solutions

- Power Control Systems
- Solar Systems

## Energy Efficiency Solutions

- Energy Management Systems
- Communication Systems

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  - AEG's UPS product portfolio
  - it's application oriented use
  - IEC 62040-3
- B. General product overview  
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  - operation / LCD display
  - shipment



A.

Classification acc. to

- AEG's UPS product portfolio
- it's application oriented use
- IEC 62040-3

# Classification acc. to AEG's UPS product portfolio

## Compact UPS

**PROTECT Home. / PROTECT A.**  
500 / 600 / 700 / 1000 / 1400 [VA]  
1-phase Output  
VFD (PROTECT Home.) / VI - technology

**PROTECT B. / PROTECT B.PRO**  
750 / 1000 / 1400 / 1800 / 2300 / 3000 [VA]  
1-phase Output  
Line-Interactive / VI - technology

**PROTECT C. / PROTECT C.R**  
1000 / 2000 / 3000 / 6000 / 10000 [VA]  
1-phase Output  
On-Line / VFI - technology

**PROTECT D.**  
1000 / 1500 / 2000 / 3000 / 6000 / 10000 [VA]  
1-phase Output  
On-Line / VFI - technology

**PROTECT 1.**  
10000 / 15000 / 20000 [VA]  
1-phase Output  
On-Line / VFI - technology

**PROTECT 1.M**  
scalable: 4000 bis 24000 [VA]  
1-phase Output  
On-Line / VFI - technology

## All-round UPS

**PROTECT 3.31**  
10 / 20 / 30 / 40 / 60 [kVA]  
1-phase Output  
On-Line / VFI - technology

**PROTECT 3.33**  
10/20/30/40/60/80/100/120 [kVA]  
3-phase Output  
On-Line / VFI - technology

**PROTECT 3.M 2.0**  
20/40/60/80/100/120 [kVA]  
3-phase Output  
Modular On-Line / VFI - technology

**PROTECT 4.33**  
160/220/300/400/500/600/800/1000 [kVA]  
3-phase Output  
On-Line / VFI - technology

**PROTECT STS**  
100 / 200 / 400 / 600 / 800 / 1200 [A]  
3-pole ( 4-pole on request )  
Automatic Transfer Switch

## Industrial UPS

**PROTECT 5.31**  
10/20/30/40/60/80/100/120 [kVA]  
1-phase Output  
On-Line / VFI - technology

**PROTECT 5.33**  
25 / 40 / 60 / 80 / 100 / 120 [kVA]  
3-phase Output  
On-Line / VFI - technology

**Rect + PROTECT 5. INV 1**  
10 / 20 / 30 / 40 / 60 [kVA]  
1-phase Output  
On-Line / VFI - technology

**Rect + PROTECT 5. INV 3**  
25 / 40 / 60 / 80 / 100 / 120 [kVA]  
3-phase Output  
On-Line / VFI - technology

**Rect + Transokraft**  
30 / 50 / 80 / 120 / 170 [kVA]  
3-phase Output  
On-Line / VFI - technology

**PROTECT 8.31**  
10/20/30/40/60/80/100/120 [kVA]  
1-phase Output  
On-Line / VFI - technology

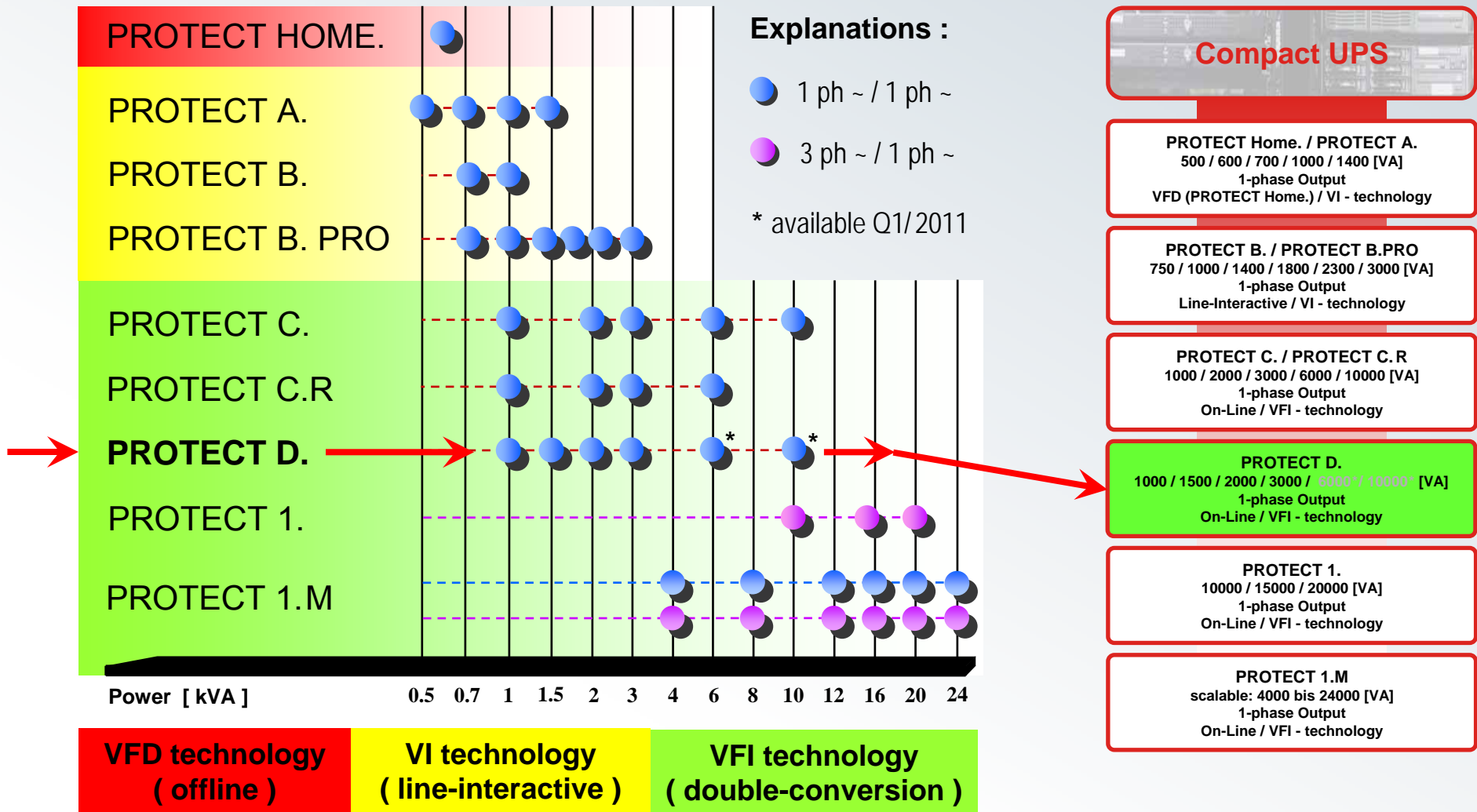
**Rect. + PROTECT 8.INV1**  
10/20/30/40/60 [kVA]  
1-phase Output  
On-Line / VFI - technology

**PROTECT 8.33**  
10/20/30/40/60/80/100/120 [kVA]  
3-phase Output  
On-Line / VFI - technology

**Rect. + PROTECT 8.INV3**  
25/40/60/80/100/120 [kVA]  
3-phase Output  
On-Line / VFI - technology

**PROTECT 8.33 high power**  
160/220/300/400/500 [kVA]  
3-phase Output  
On-Line / VFI - technology

# Classification acc. to AEG's Compact-UPS product portfolio



# UPS product portfolio acc. to their use

## Compact UPS

### Home, SoHo

**PROTECT HOME.**  
600 VA  
Comprehensive protection for satellite, TV, phone, fax or modem.



**PROTECT A.**  
500 to 1400 VA  
Protects PCs, workstations and phone systems.



### Office, SoHo, IT segment

**PROTECT B.(PRO)**  
750 to 3000 VA  
Rack or tower for server and network components with sinusoidal output.



**PROTECT C. / C.R**  
1000 to 10000 VA  
Rack or tower for sensitive networks, small computer centres, Intranet and Internet servers.



**PROTECT D.**  
1000 to 10000 VA  
Rackmount UPS, especially designed for Data & IT equipment..



**PROTECT 1.**  
10000 to 20000 VA  
For small data centres, protection of cash till systems, building technology.



## Medium High Power UPS

### Data Centre Industry

**PROTECT 1.**  
10 to 20 kVA  
For small data centres, protection of cash till systems, building technology.



**PROTECT 1.M**  
4 to 24 kVA  
Scaleable, modular high-performance UPS-system for the IT sector.



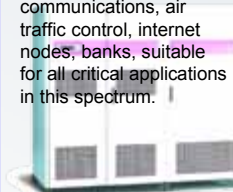
**PROTECT 3.**  
10 to 120 kVA  
Host computers, file servers, Workstations and computer centres as well as complex networks in industrial companies.













**PROTECT 3.M 2.0**  
20 to 120 kVA (scalable)  
Computer centres, Telecommunications, Internet nodes, banks and insurance companies, Building control Systems, process Control systems.



**PROTECT 4.**  
160 to 1000 kVA  
Building control systems, computer centres, telecommunications, air traffic control, internet nodes, banks, suitable for all critical applications in this spectrum.



# Classification acc. to IEC 62040-3

Voltage Phenomenon		Time	e.g.	IEC 62040-3	UPS solution	Arrester solution
PROTECT D.	1. Outage - blackouts	> 10 ms		<b>VFD</b>  Voltage + Frequency Dependent	Classification 3  Offline	—
	2. Sags / brownouts					—
	3. Dynamic overvoltage					—
	4. Undervoltage	continuous		<b>VI</b>  Voltage Independent	Classification 2  Line-Interactive	—
	5. Overvoltage	continuous				—
	6. Transients (Surge)	< 4 ms		<b>VFI</b>  Voltage + Frequency Independent	Classification 1  (true) Online real Double-Conversion	Limited protection via UPS (extended protection recommended (10.)) —
	7. Frequency variations	sporadic				—
	8. Voltage distortion (Burst)	periodic				see as well 10. —
	9. Voltage harmonics	continuous				—
	10. Lightning	sporadic			—	Surge- and Over-voltage protection (IEC 60364-5-534)

Publication by ZVEI: UPS Guide



B.

# General product overview Availability



# General product overview



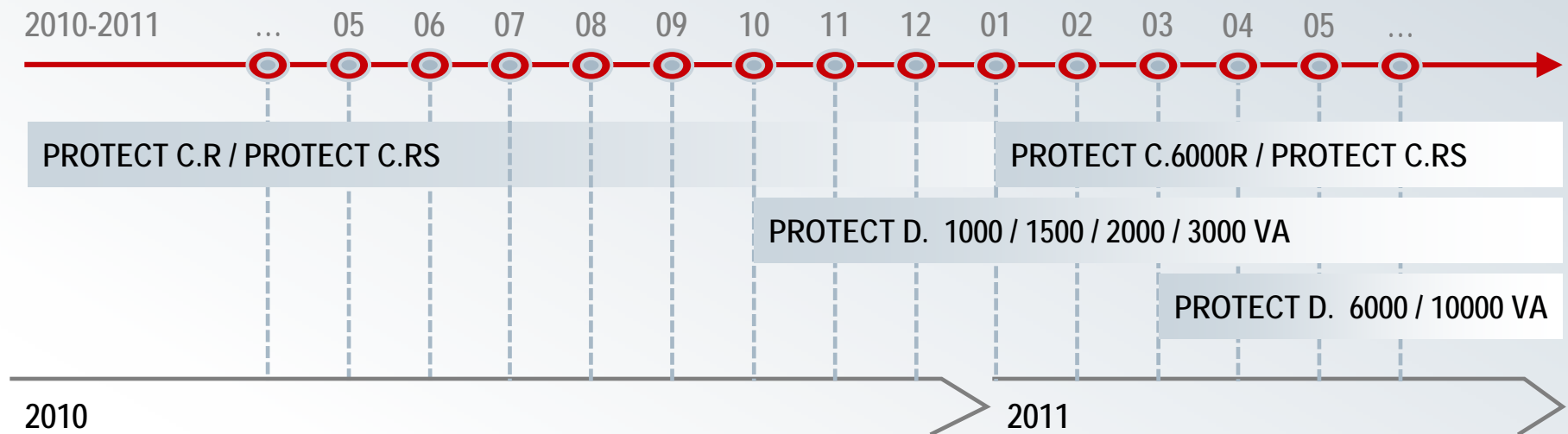
- More powerful (pf=0.9lag.)
- Less footprint (2U incl. battery)
- Extended user oriented communication
- Hot-swappable and extendable battery system
- Innovative locking mechanism for output sockets
- Easiest & most flexible operation thanks to LCD display

- 1000 VA / 900 W
- 1500 VA / 1350 W
- 2000 VA / 1800 W
- 3000 VA / 2700 W
- 6000 VA / 5400 W
- 10000 VA / 9000 W

Availability  
Q1/2011

# Availability/ transfer process Market introduction

PROTECT C.R / C.RS / PROTECT D.



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# Transfer process in detail

## PROTECT C.R series

- PROTECT C.1000R / C.1000RBP
- PROTECT C.2000R / C.2030RBP
- PROTECT C.3000R
- PROTECT C.6000R / C.6000RBP

## PROTECT C.RS series

- PROTECT C.1000RS
- PROTECT C.2000RS
- PROTECT C.3000RS

## PROTECT D. series 10 / 2010 >>>

- PROTECT D.1000 / D.1000BP
- PROTECT D.1500 / D.1500BP
- PROTECT D.2000 / D.2030BP
- PROTECT D.3000

## Transfer solution 01 / 2011 >>>

- 1 PROTECT C.6000R / C.6000RBP
- 2 PROTECT C.2000RS / C.3000RS / C.2030RBP
- 3 PROTECT D.1000 / D.1500 / D.2000 / D.3000  
D.1000BP / D.1500BP / D.2030BP

## Transfer solution 03 / 2011 >>>

- 1 PROTECT C.2000RS / C.3000RS / C.2030RBP
- 2 PROTECT D.1000 up to PROTECT D.10000  
incl. corresponding battery packs



C.

## Product features in detail

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# Performance – more powerful series

Power rating at pf=0.9lag. for all PROTECT D. models

- 1000 VA / 900 W
  - 1500 VA / 1350 W
  - 2000 VA / 1800 W
  - 3000 VA / 2700 W
  - 6000 VA / 5400 W
  - 10000 VA / 9000 W
- more power for modern SPS loads with PFC correction
  - Narrow -graded power steps to fit exactly the power demand



**3000 VA / 2100 W**

*~ 30% more  
active power*



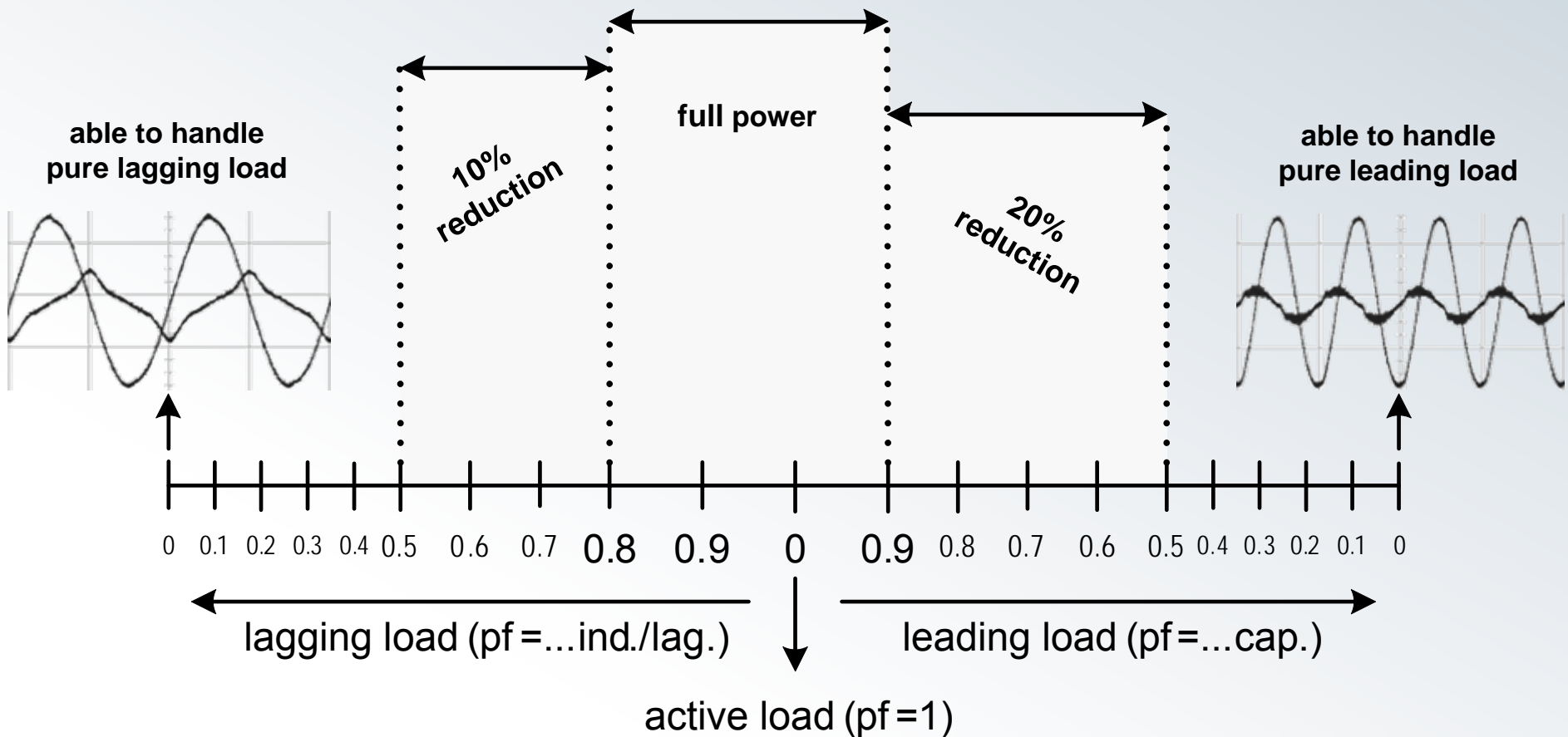
**3000 VA / 2700 W**

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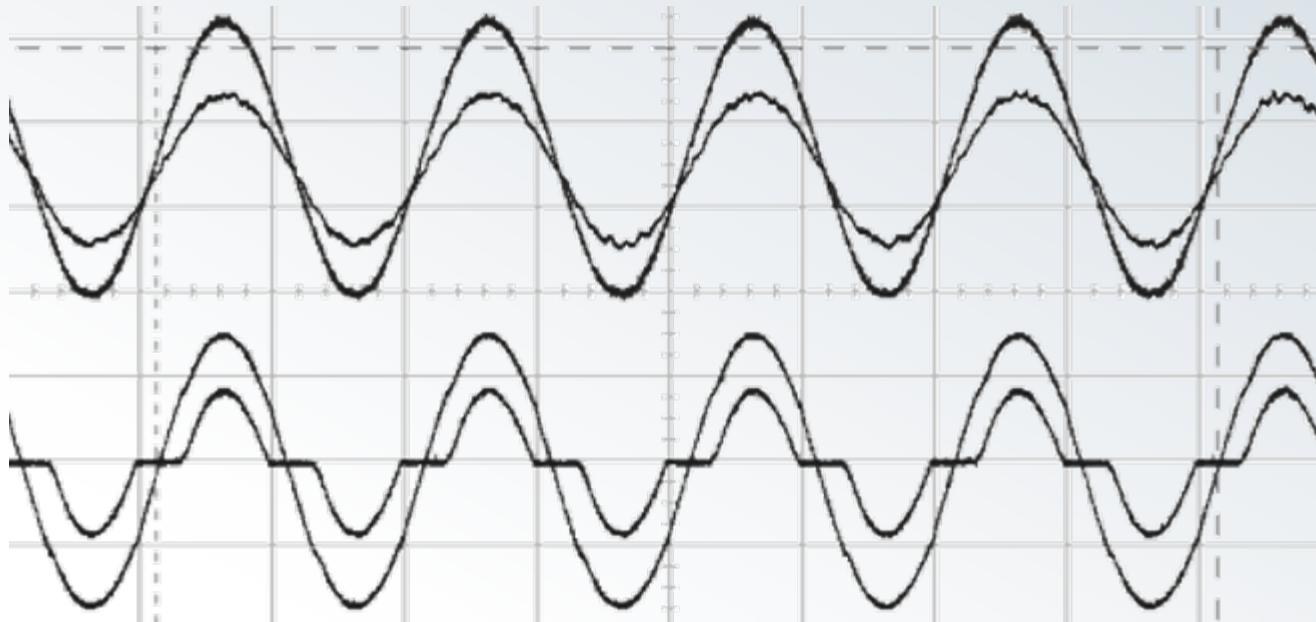
# Performance – power bandwidth

## Able to operate in the complete power factor spectrum



# Performance – power bandwidth

## Able to operate 100% non-linear load



Input voltage (mains)  
Input current (mains)

UPS output voltage  
Current (UPS load)

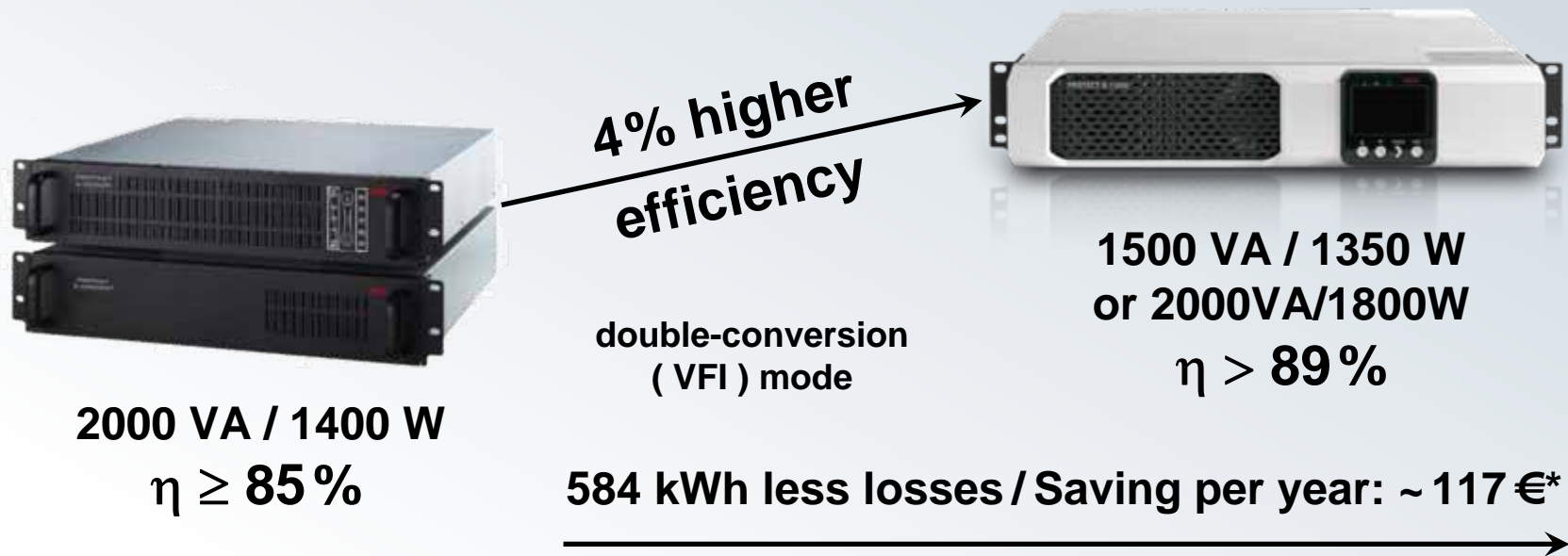
- Cleaner power ( $\lambda \geq 0.99$  THDi  $\leq 8\%$ )
- Less power pollution
- Suitable for all kind of loads

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# Performance – efficiency

## Short-term amortization – less cooling



- Consumption at 90% load (1260W)  
Losses at 8760h/year = 1948 kWh

- Consumption at 1260W  
Losses = 1364 kWh

**909 kWh less losses**  
**Saving/year: ~ 182 €\***

**$\eta \geq 98\%$  ECO+**  
**at the weekend**

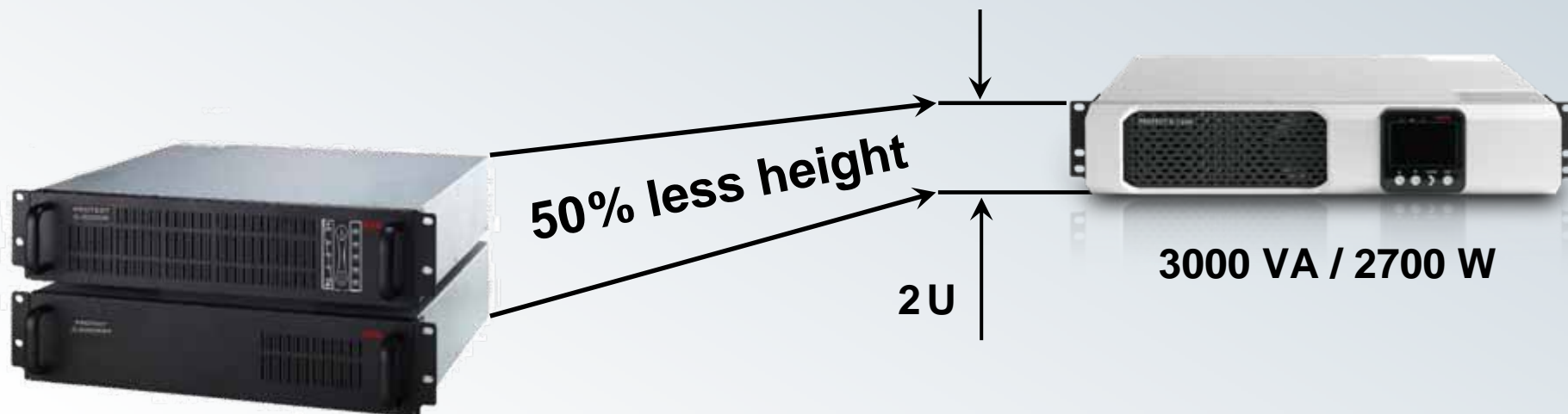
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\* calculation basics  
EUR 0.20 per kWh



# Footprint



**3000 VA / 2100 W**

5 min. at full load  
(external battery)

- 2 U height for all PROTECT D. models including battery system
- High performance batteries (more powerful at high output level)

PROTECT D.3000 6 min. at 2100 W (internal battery system)  
thanks to electronics improvement even at lower DC voltage (2 blocks less)

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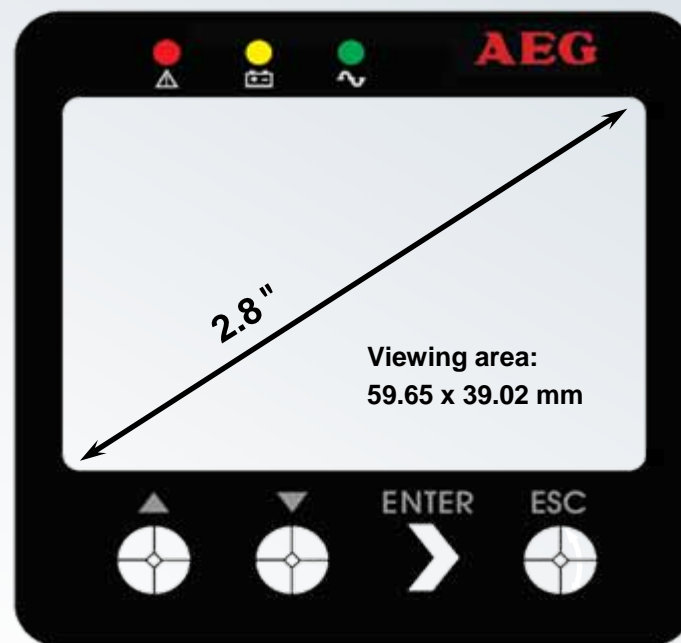
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# PROTECT D. • more easy to operate



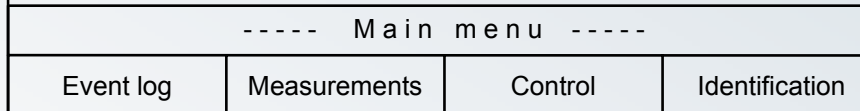
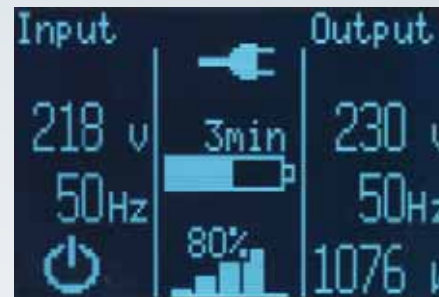
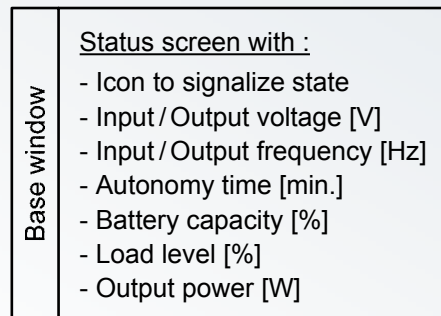
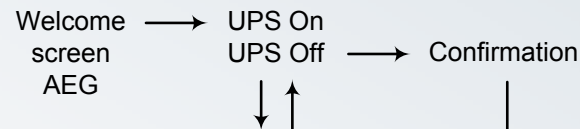
- Display for UPS status, Control, Settings, Measurements, Event Log, Identification
- Real time clock (synchronized automatically)
- Data logger for 127 events
- Display operation lockable; settings password protected

- Graphical LCD display (dual backlight 128x64pixel)
- Multilingual >> 5 languages (EN / DE / FR / ES / RU)



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# LCD Display PROTECT D. series • Menu tree completely



Notice / Alarm screen  
(current event)

- UPS On Bypass
- On Manual Bypass
- UPS System Normal
- UPS On Battery
- In Economical Mode (ECO)
- In High Efficiency Mode (ECO+)
- UPS Off
- ABM State Charging
- ABM State Floating
- Clock Set Done
- Battery Disconnected
- Low Battery Warning
- Battery Test Failed
- Service Battery
- Output Overload
- Utility Not Present

- PUE [%]
- Output [W] & [VA]
- Output [A] & [pf]
- Output [V] & [Hz]
- Input [V] & [Hz]
- Battery [V] % [%]
- DC Bus [V]
- Ext. batt. packs
- Σ kWh since reset

- Bypass Not Available
- Input AC Under/OverVoltage
- Input Under/OverFrequency
- Inverter Fault
- Rectifier Fault
- Charger Failure
- Output Short Circuit
- Heatsink Over Temperature
- Fan Failure

- Go to bypass
- Battery test
- Reset error state
- Load segments

- Type / Model
- Part number
- Serial number
- UPS Firmware

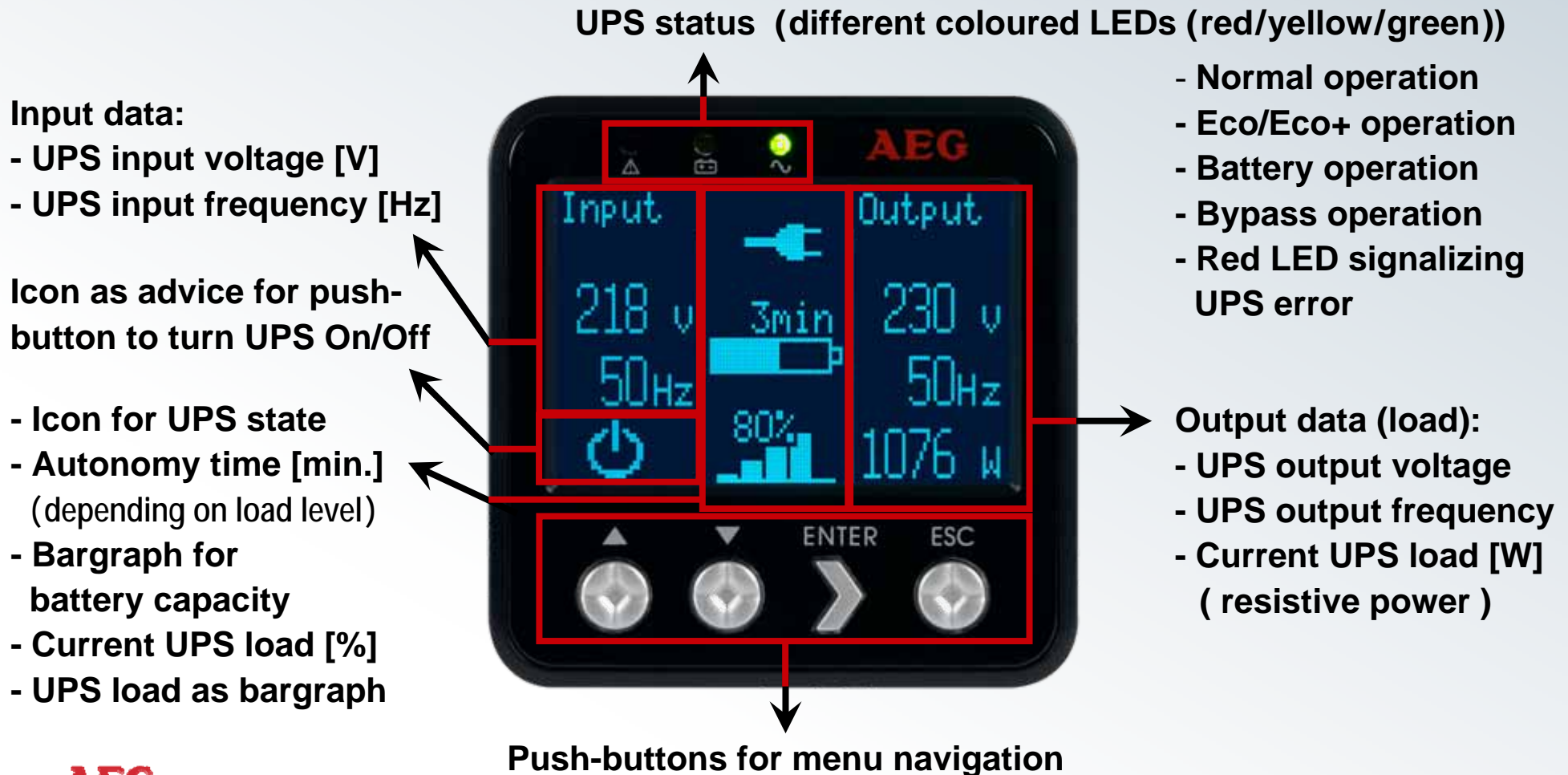
## Settings

- Change language
- User password
- Audible alarms
- Set date and time
- Relay onfiguration
- Control commands from serial port
- Output voltage
- Output frequency
- Load alarm level
- Power strategy
- Automatic start delay
- Automatic on battery shutdown
- Start w/o mains
- Battery saving mode
- Site wiring fault alarm
- Charger output voltage
- Battery charge % to restart
- Automatic battery tests
- Periodic battery test
- Ambient temperature warning
- REPO operation
- Reset cumulative consumption kWh
- Battery limit time
- Auto reboot
- Auto bypass
- Start w/o battery
- Clear event log
- LCD contrast
- Restore factory setting

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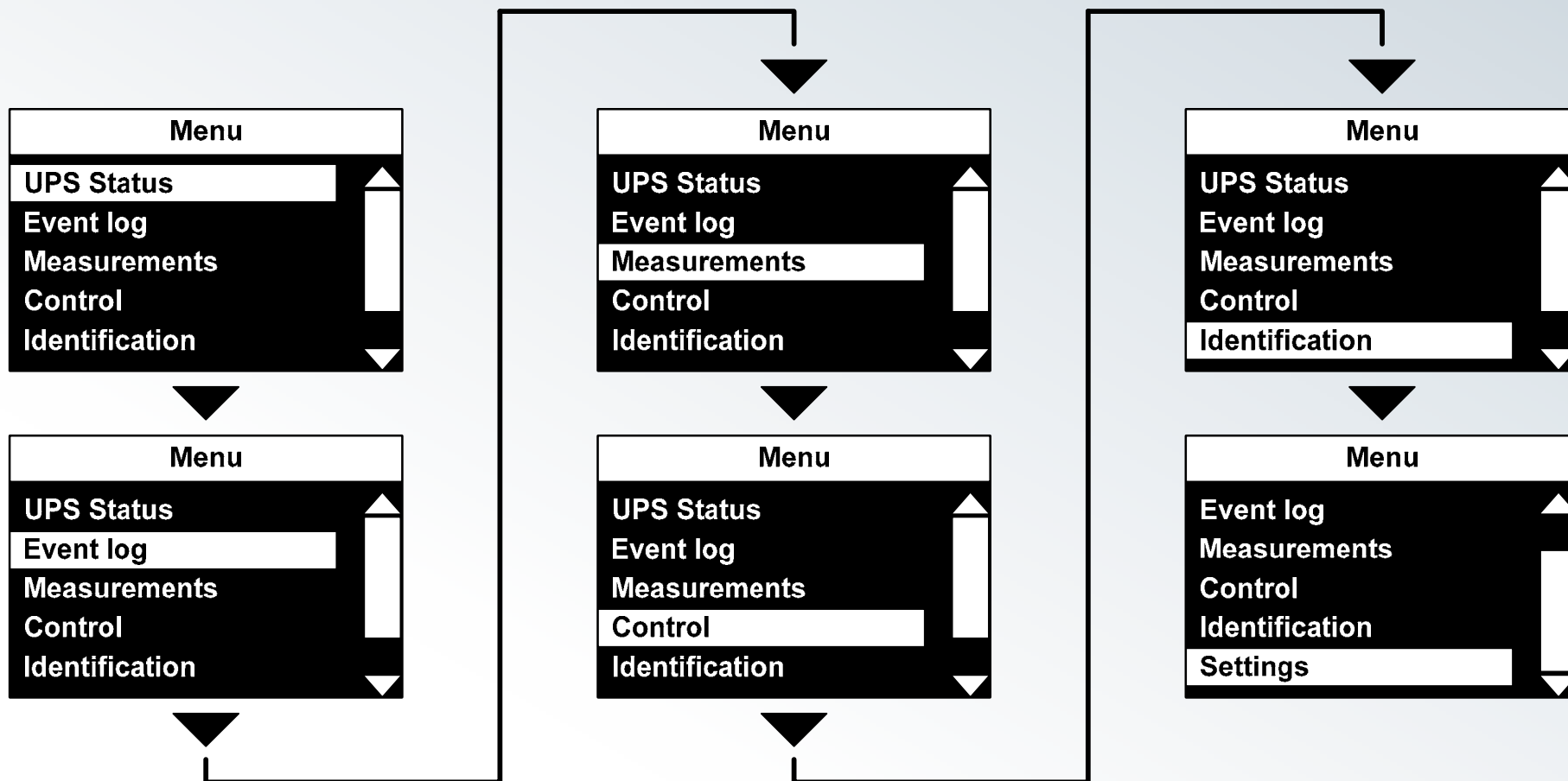
# LCD Display • Status screen • Overview, e.g. PROTECT D.1500 at normal (double-conversion) operation



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# LCD Display • Main menu

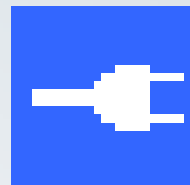


# LCD Display • UPS Status

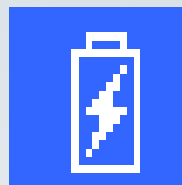


**PROTECT D.1500**  
(normal operation)

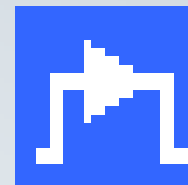
UPS normal



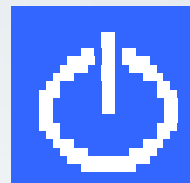
on battery



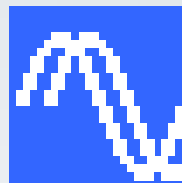
on bypass



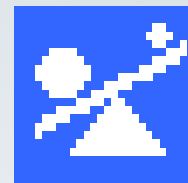
on stand-by



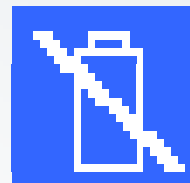
converter



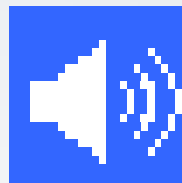
overload



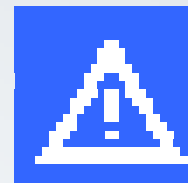
no / bad battery



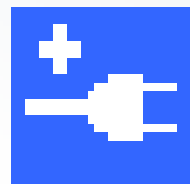
alarm active



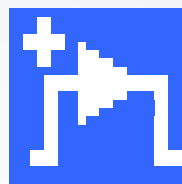
critical fault



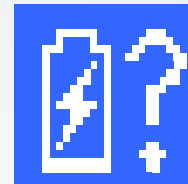
high efficiency



ECO+ mode



battery check



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# LCD Display • UPS Status, e.g. ...

UPS in converter mode



UPS proceeding a battery check



UPS in economical (ECO) mode



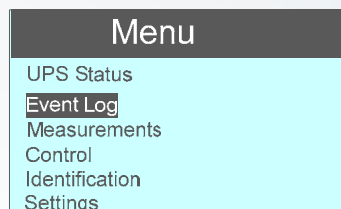
UPS proceeds battery check successfully

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# LCD Display • Event log



03/01/ 2009 09:05  
Alarm#25  
OutputOverload  
1/3

02/28/ 2009 15:44  
Event# 1999  
Clock set done  
2/3

02/28/ 2009 13:01  
Event#58  
Output Short Circuit  
3/3

- To Bypass Command
- From Bypass Command
- UPS On Command
- UPS Off Command

Control

- Battery Disconnected
- Low Battery Warning
- Shutdown Imminent
- Battery Test Failed
- Service Battery

Battery

- UPS Control Power ON
- UPS On Bypass
- On Manual Bypass
- UPS System Normal
- UPS On Battery
- In Economical Mode (ECO)
- In High Efficiency Mode (ECO+)
- UPS Off
- ABM State Charging
- ABM State Floating
- ABM State Resting
- Clock Set Done
- In Economical Mode (ECO)
- In High Efficiency Mode (ECO+)

Status

- Utility Not Present
- Bypass Not Available
- Input AC Under/ Over Voltage
- Bypass AC Under/ Over Voltage
- Input Under/ Over Frequency
- Bypass Under/ Over Frequency
- Site Wiring Problem
- Remote Emergency Power Off
- Output Overload
- Battery DC Over Voltage
- Charger Failure
- Inverter AC Under/ Over Voltage
- DC Link Under/ Over Voltage
- Inverter Fault
- Rectifier Fault
- Output Short Circuit
- Heatsink Over Temperature
- Fatal EEPROM Fault
- Fan Failure
- DC link imbalance

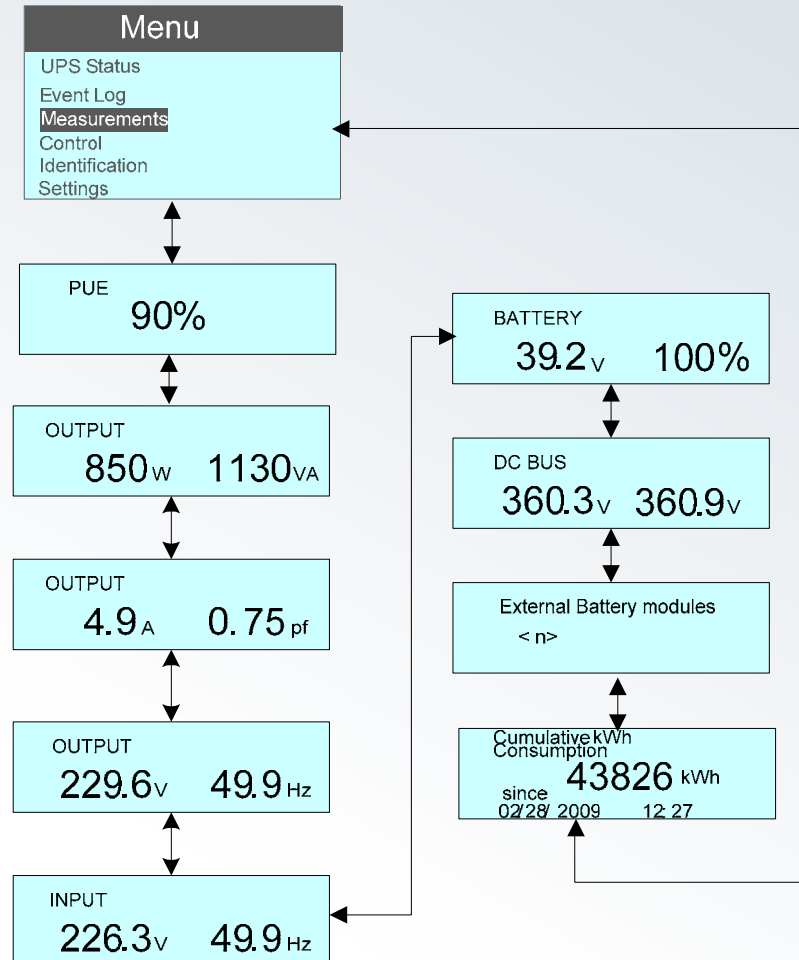
Externally Influenced Alarms

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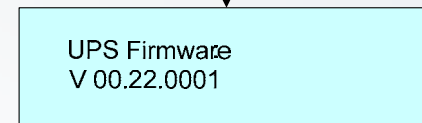
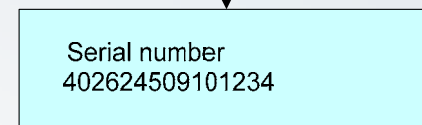
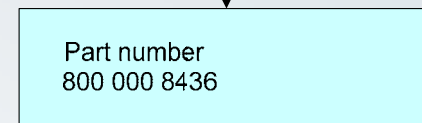
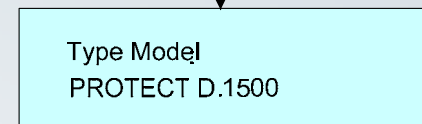
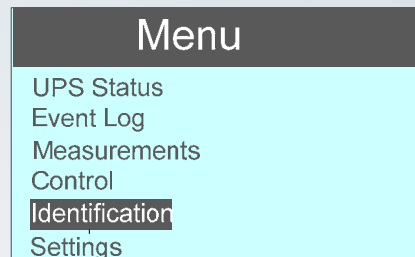
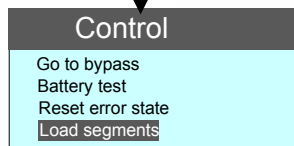
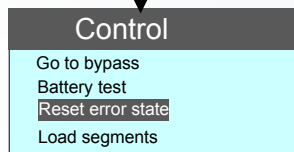
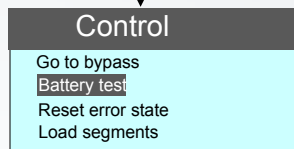
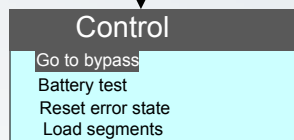
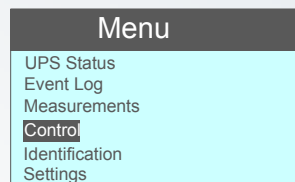
Power Solutions



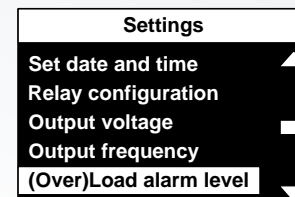
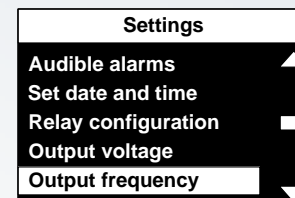
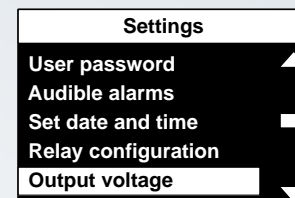
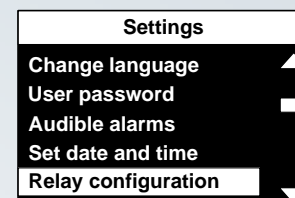
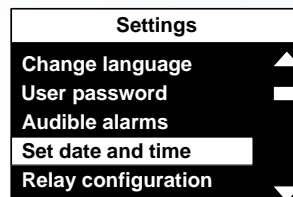
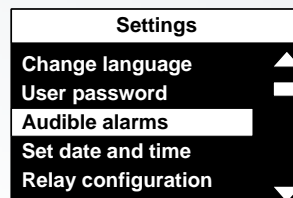
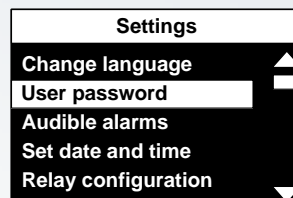
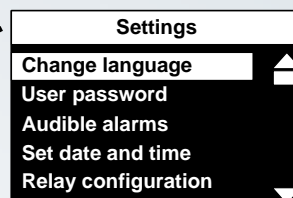
# LCD Display • Measurements



# LCD Display • Control • Identification



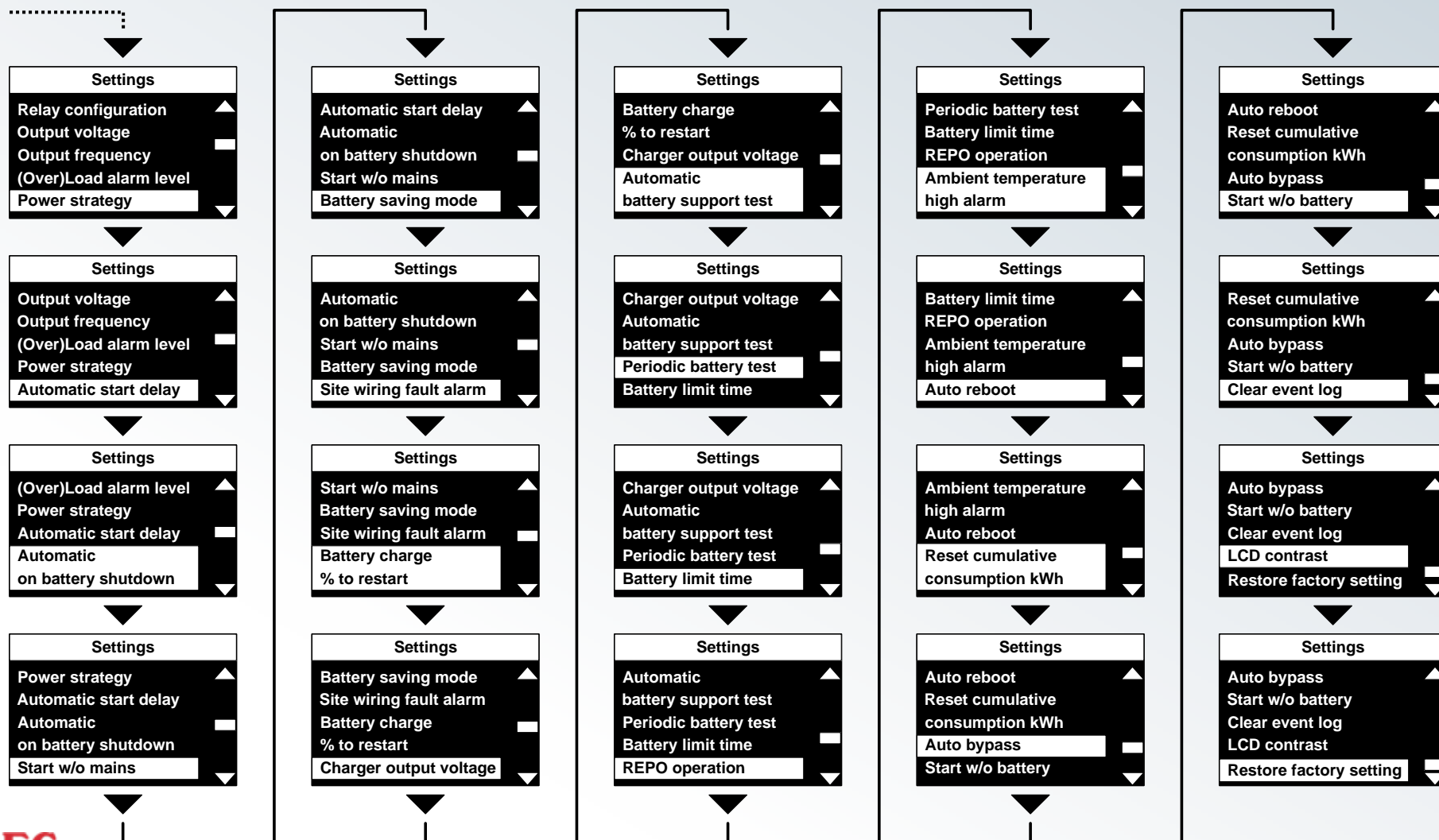
# LCD Display • Settings (I)



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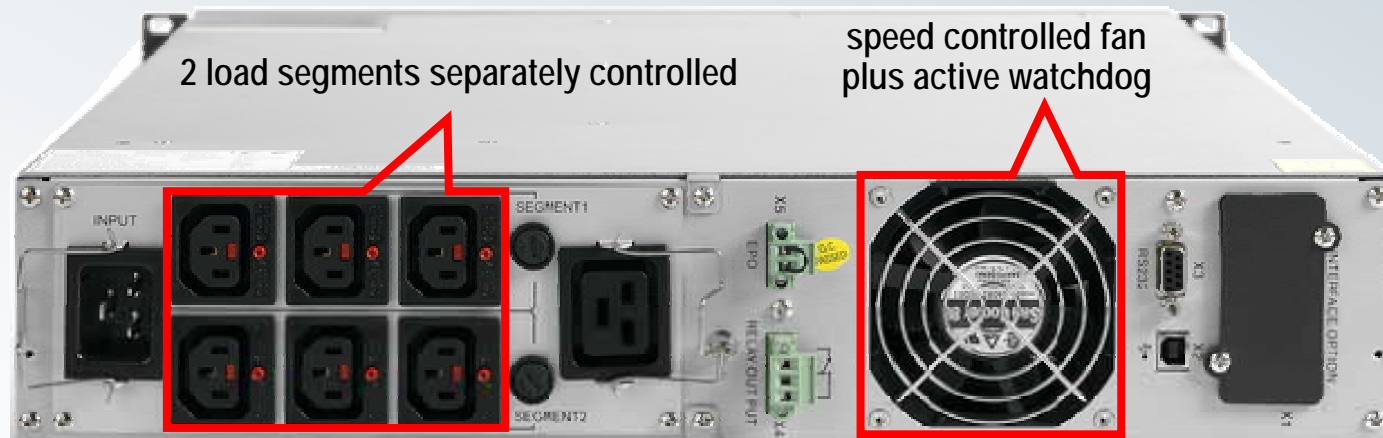
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# LCD Display • Settings (II)



# PROTECT D. • Rear view

## PROTECT D.3000



automatic locking devices



free programmable relay & EPO



dual-monitoring (RS232&SNMP)



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# PROTECT D. • Rear view PROTECT D.1000 & PROTECT D.2000 ( PROTECT D.1500 similar to PROTECT D.1000 )

## PROTECT D.1000



## PROTECT D.2000



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# PROTECT D.BP • Battery packs

Height: 2U



Height:  
2x2U



Autonomy time [min.]

Full load / half load (at pf = 0.9lag.)  
with 1 pack at full load / half load (at pf = 0.9lag.)  
with 2 packs at full load / half load (at pf = 0.9lag.)  
with 3 packs at full load / half load (at pf = 0.9lag.)  
with 4 packs at full load / half load (at pf = 0.9lag.)

Full load / half load (at pf = 0.7lag.)  
with 1 pack at full load / half load (at pf = 0.7lag.)  
with 2 packs at full load / half load (at pf = 0.7lag.)  
with 3 packs at full load / half load (at pf = 0.7lag.)  
with 4 packs at full load / half load (at pf = 0.7lag.)

	D.1000	D.1500	D.2000	D.3000
Full load / half load (at pf = 0.9lag.)	6 / 16	5.5 / 14	6 / 16	3.5 / 9
with 1 pack at full load / half load (at pf = 0.9lag.)	31 / 68	25 / 61	33 / 71	18 / 45
with 2 packs at full load / half load (at pf = 0.9lag.)	51 / 110	46 / 112	59 / 129	34 / 84
with 3 packs at full load / half load (at pf = 0.9lag.)	82 / 192	69 / 172	88 / 183	53 / 122
with 4 packs at full load / half load (at pf = 0.9lag.)	100 / 246	90 / 221	119 / 260	69 / 165
Full load / half load (at pf = 0.7lag.)	9 / 19	8 / 18	10 / 21	6 / 14
with 1 pack at full load / half load (at pf = 0.7lag.)	35 / 71	31 / 65	37 / 77	24 / 51
with 2 packs at full load / half load (at pf = 0.7lag.)	63 / 130	56 / 119	67 / 141	44 / 92
with 3 packs at full load / half load (at pf = 0.7lag.)	94 / 194	83 / 178	99 / 210	64 / 137
with 4 packs at full load / half load (at pf = 0.7lag.)	126 / 261	112 / 240	134 / 283	87 / 185

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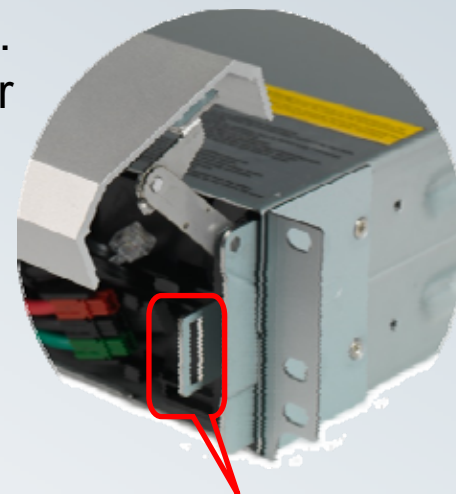
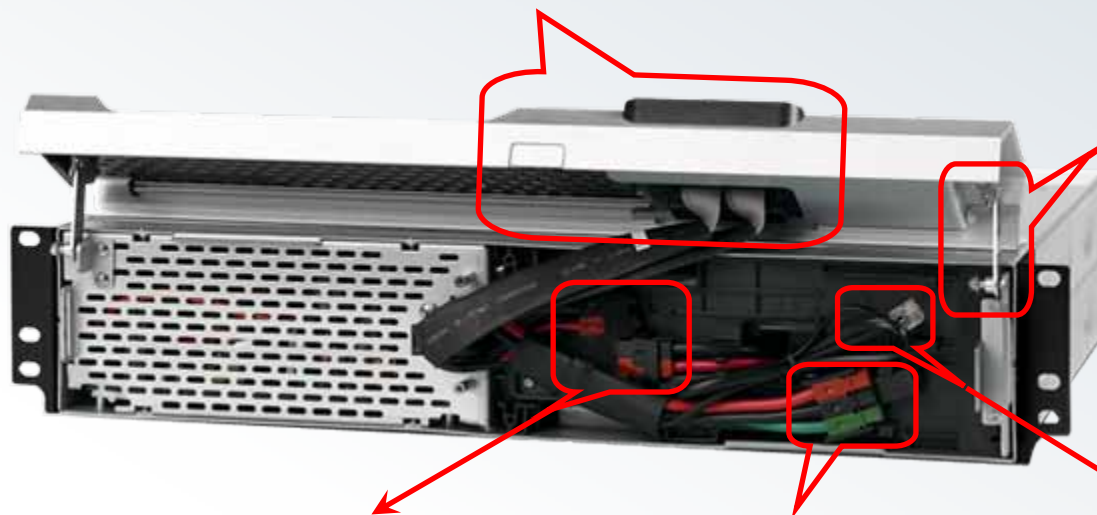
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# Battery connectors at front side

Front panel incl. LCD display  
remains to the UPS unit  
( hot-swappable process )

Easy handling, e.g.  
flip-over front cover



Fixing the front panel  
by side-on movement

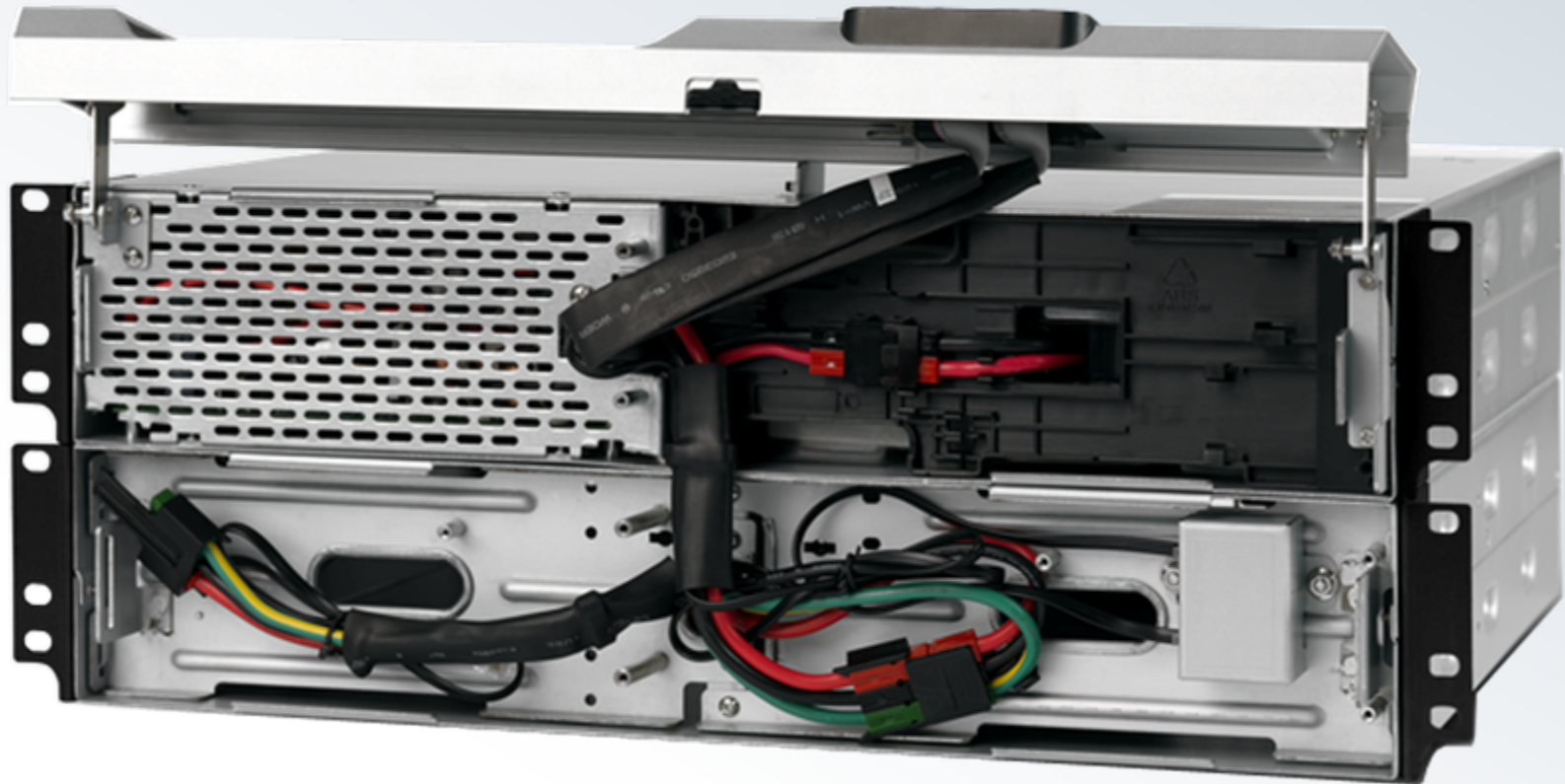
Connection for  
internal battery  
with fixed polarity  
( + / - )

Connector for  
external battery  
with fixed polarity  
( + / - / PE )

Automatic detection of  
external battery packs



# Fixed battery connection



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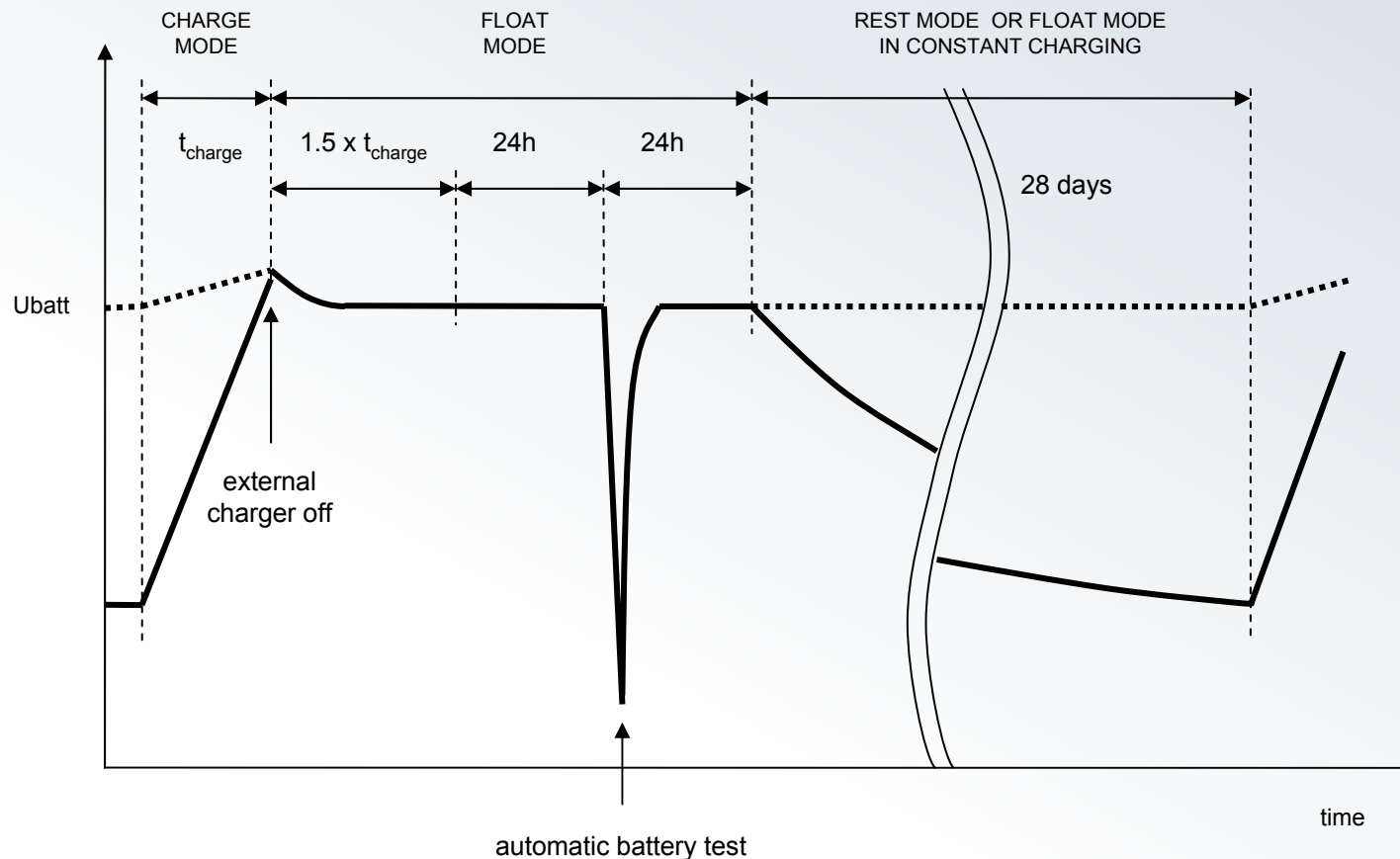
# Easy battery replacement



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# Battery management



## Charging cycle modes:

- Charge mode (constant current)
- Float mode (constant voltage)
- Rest mode (battery in stand-by)

## Additional features:

- Float mode voltage adjustable
- temperature compensation
- automatic battery pack detection

# Shipment PROTECT D.1000 / PROTECT D.1500 / PROTECT D.2000

## AEG

### PROTECT D. 1000



1 x PROTECT D. 1000  
2 x rack mounting brackets



1 x RS232 cable



1 x USB cable



2 x mains cords  
(EU & UK)



1 x operating instruction  
(german/english)



3 x load cords



2 x rack sliders (800mm)  
+ screws



PROTECT D.2000  
1100mm



1 x CompuWatch CD



5 x CompuWatch licenses

## AEG

Power Solutions

# Shipment PROTECT D.3000

## AEG

### PROTECT D. 3000



1 x PROTECT D. 3000  
2 x rack mounting brackets



1 x USB cable



1 x RS232 cable



3 x load cords 10A



1 x load cord 16A



2 x mains cords  
(EU & UK)



2 x rack sliders (1100mm)  
+ screws



1 x operating instruction  
(german/english)



1 x CompuWatch CD



5 x CompuWatch licenses

## AEG

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# Competitiveness • Summary

- **More real power**  
( pf of 0.9 lagging, suitable for all kind of critical loads )
- **Compact size, modern solid look**  
(aluminium front, graphical display)
- **Highest efficiency up to 98%**  
(different operation modes available)
- **Converter operation mode available**
- **Strong battery charger with intelligent battery management**  
(three stage technology; adjustable; incl. temperature compensation)
- **Easy battery extensions & replacements**  
(connections all done from the front)
- **Highest flexibility acc. communication (dual-monitoring)**  
and adjustments (refer to the settings of the LCD display)



... future extension



- PROTECT D.1000 / D.1500 / D.2000 / D.3000  
(all 2U, each with integrated battery)
  - PROTECT D.1000BP / D.1500BP / D.2030BP  
(Battery extension, each 2U)
  - PROTECT D.6000 (3U)  
(with integr. battery & ext. manual bypass)
  - PROTECT D.6000BP / D.10000BP  
(Battery extension, each 3U)
  - PROTECT D.10000 (5U)  
(with integrated battery)
- Battery front panel can be operated separately

**AEG**

Power Solutions